Energy Conservation and Building Energy Monitor

presented by

Introduction

Why Conserve Energy?

- **Energy conservation saves valuable resources**
- **Reducing Fort Carson energy waste allows planned utility dollars to be redirected to other quality of life projects**
- **Comply with the Energy Policy Act (EPACT) of 1992 and Presidential**

Objectives

- Understand Fort Carson's energy conservation responsibilities
  - Energy Conservation Officer (ECO)
  - Building Energy Monitor (BEM)
- Proactive conservation methods
- Awareness of energy waste

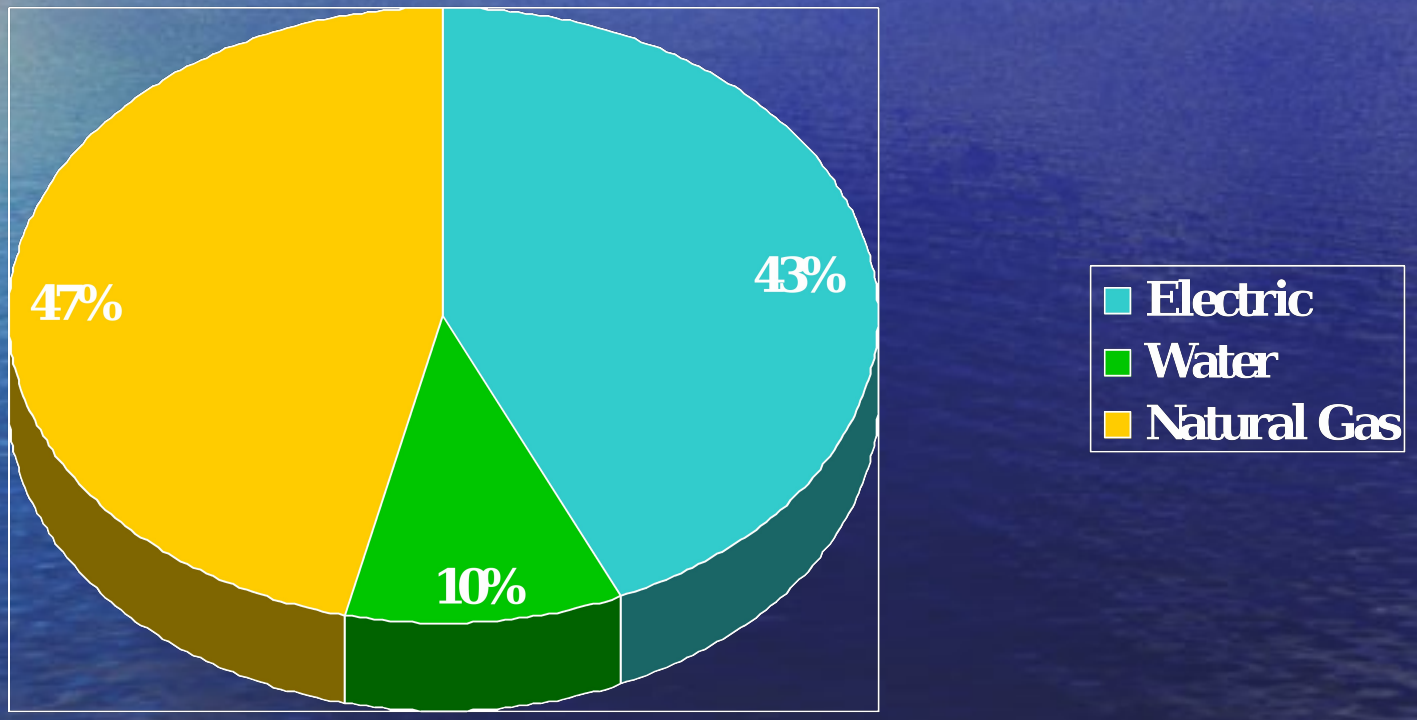
Objectives

- **Understand how activities and projects advance us towards the Fort Carson 2027 sustainability goals**
  - **100% renewable energy use (#1)**
  - **Reduce water use by 75% (#1)**
  - **100% procurement of energy efficient products (#9)**

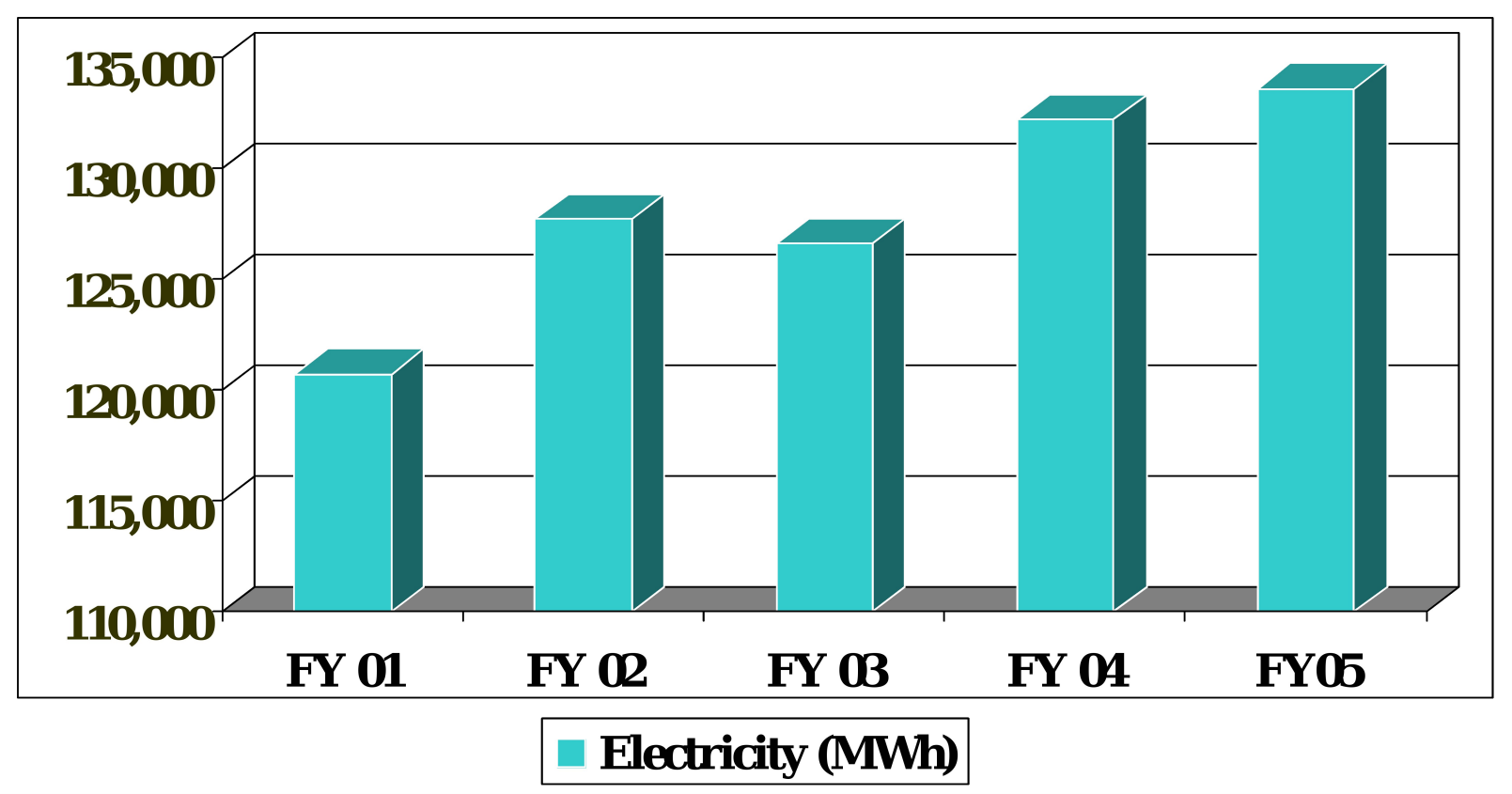
Fort Carson's Energy Use

- Approximately **$44,000** spent every day for electric, natural gas and water
- Natural gas use increases in winter months and water and electric use increases in summer months

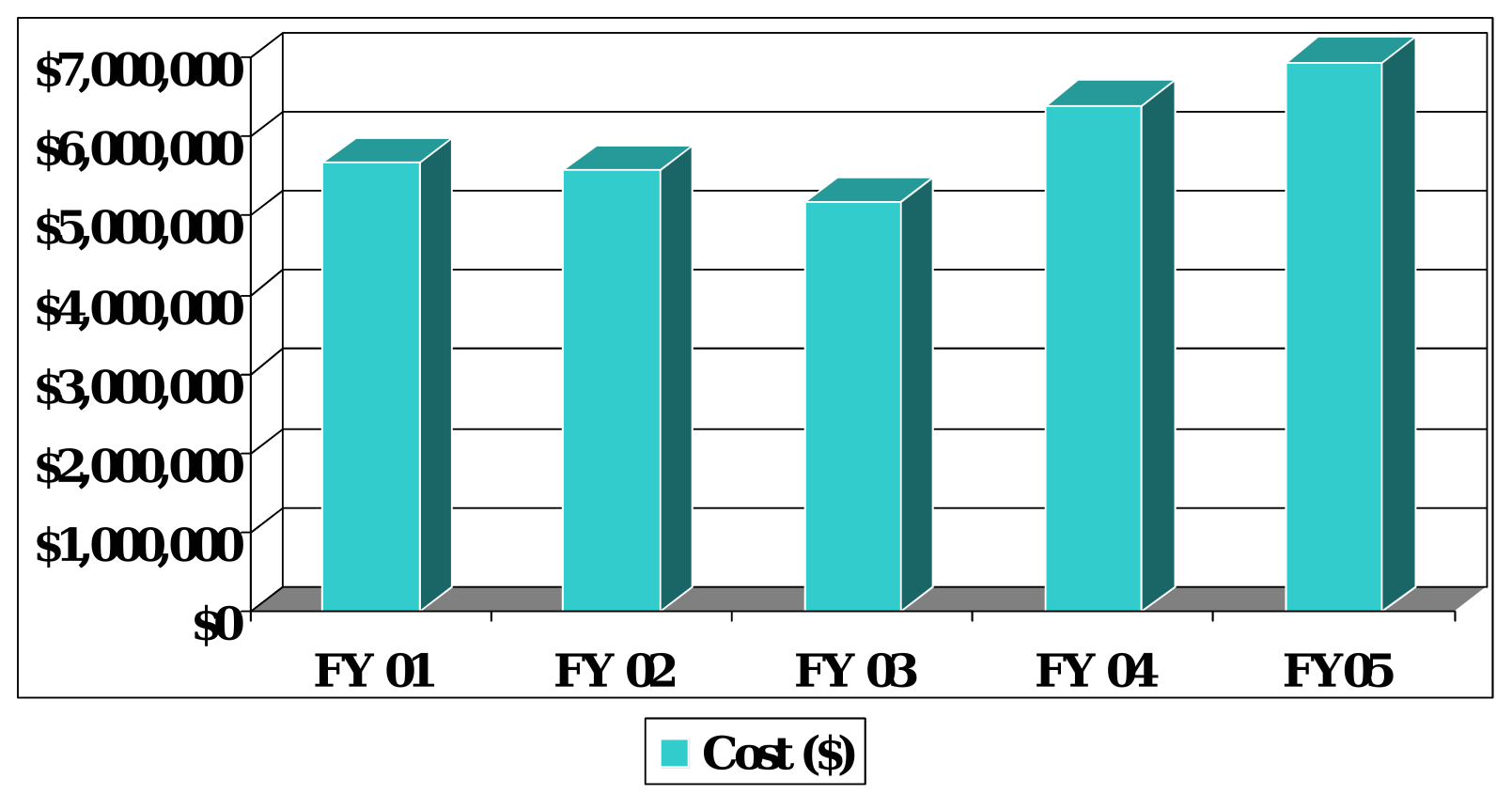
FY05 Utility Costs
$15,981,487



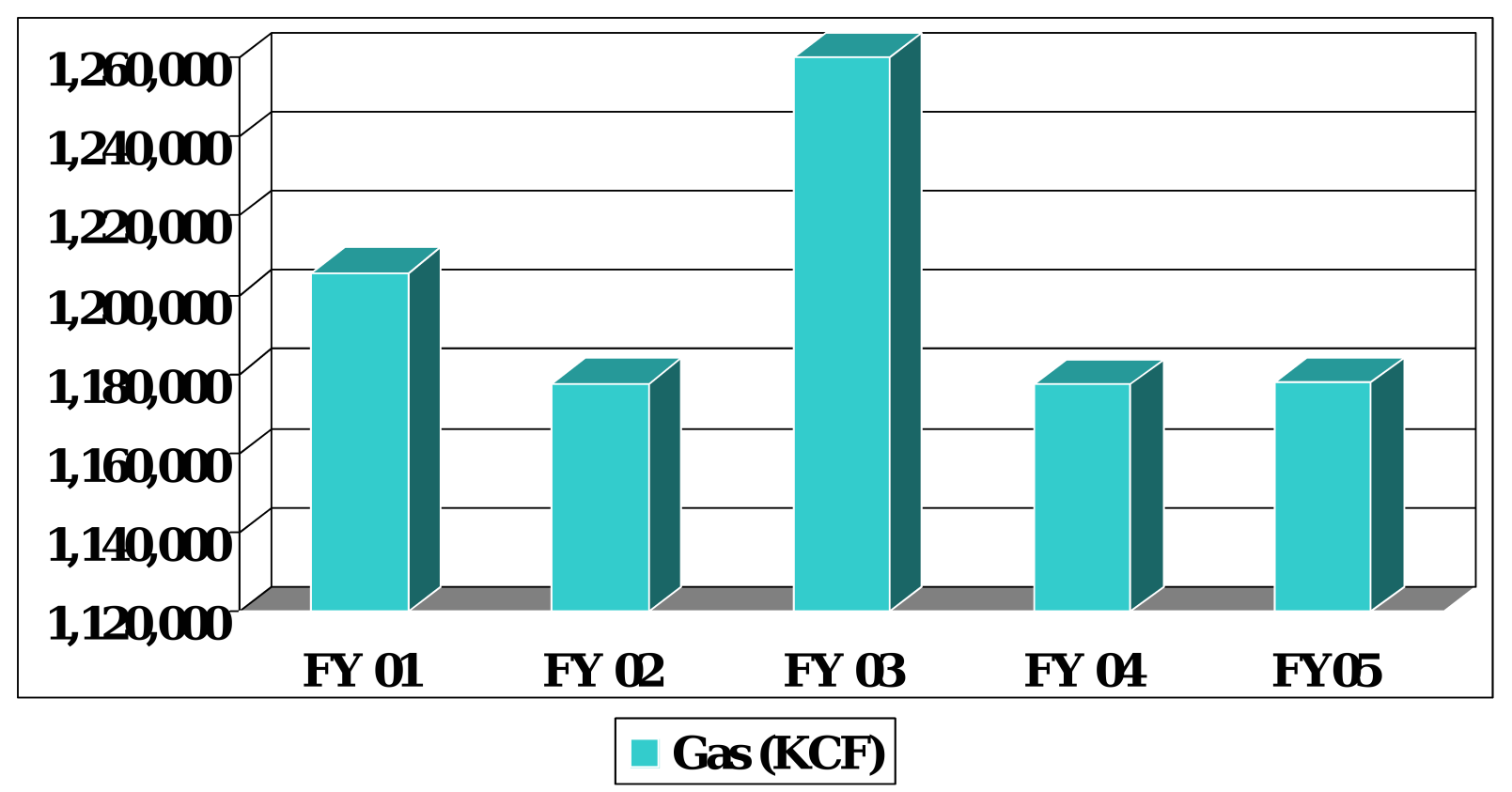
Electricity Consumption



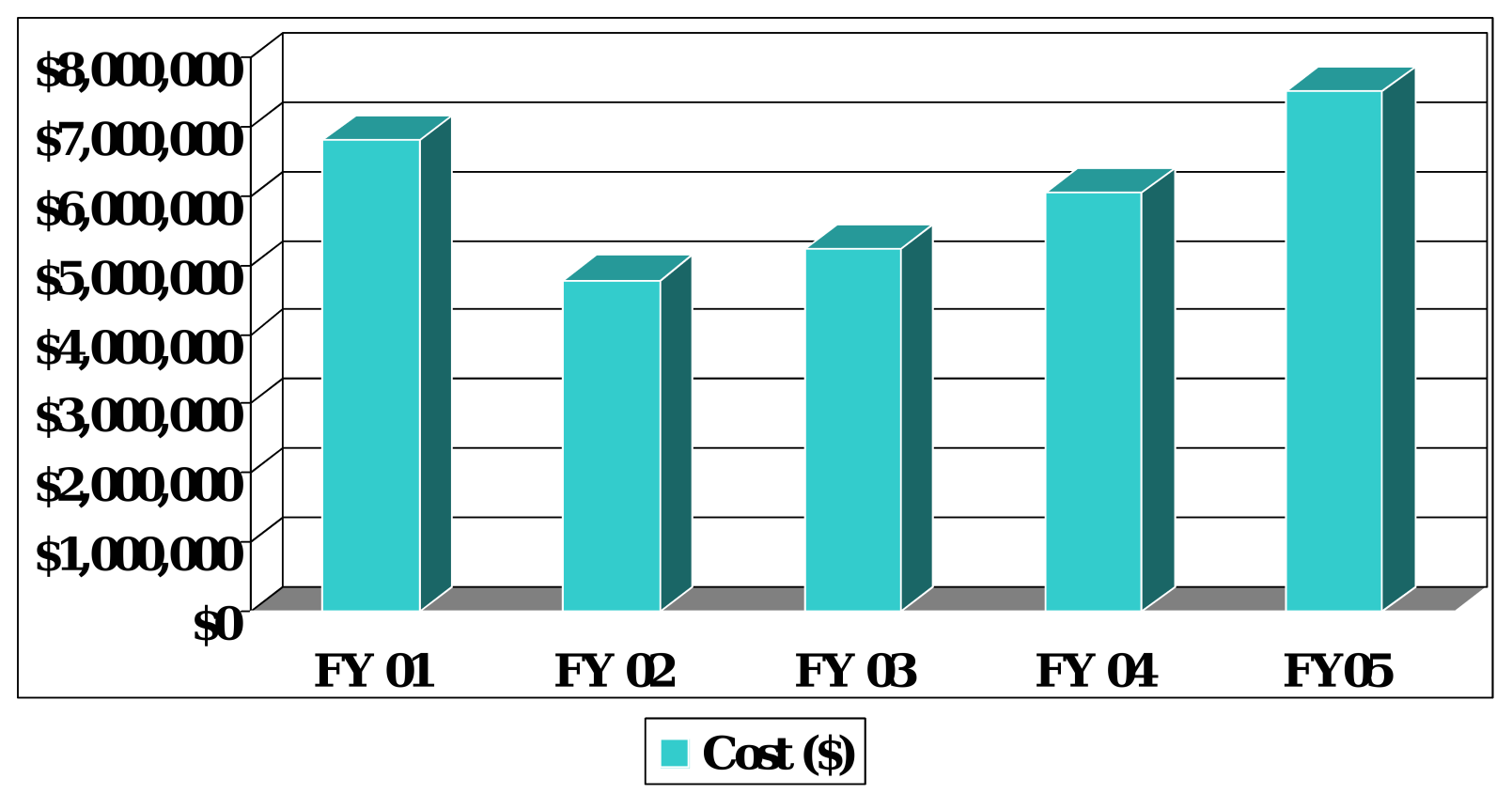
Electricity Costs



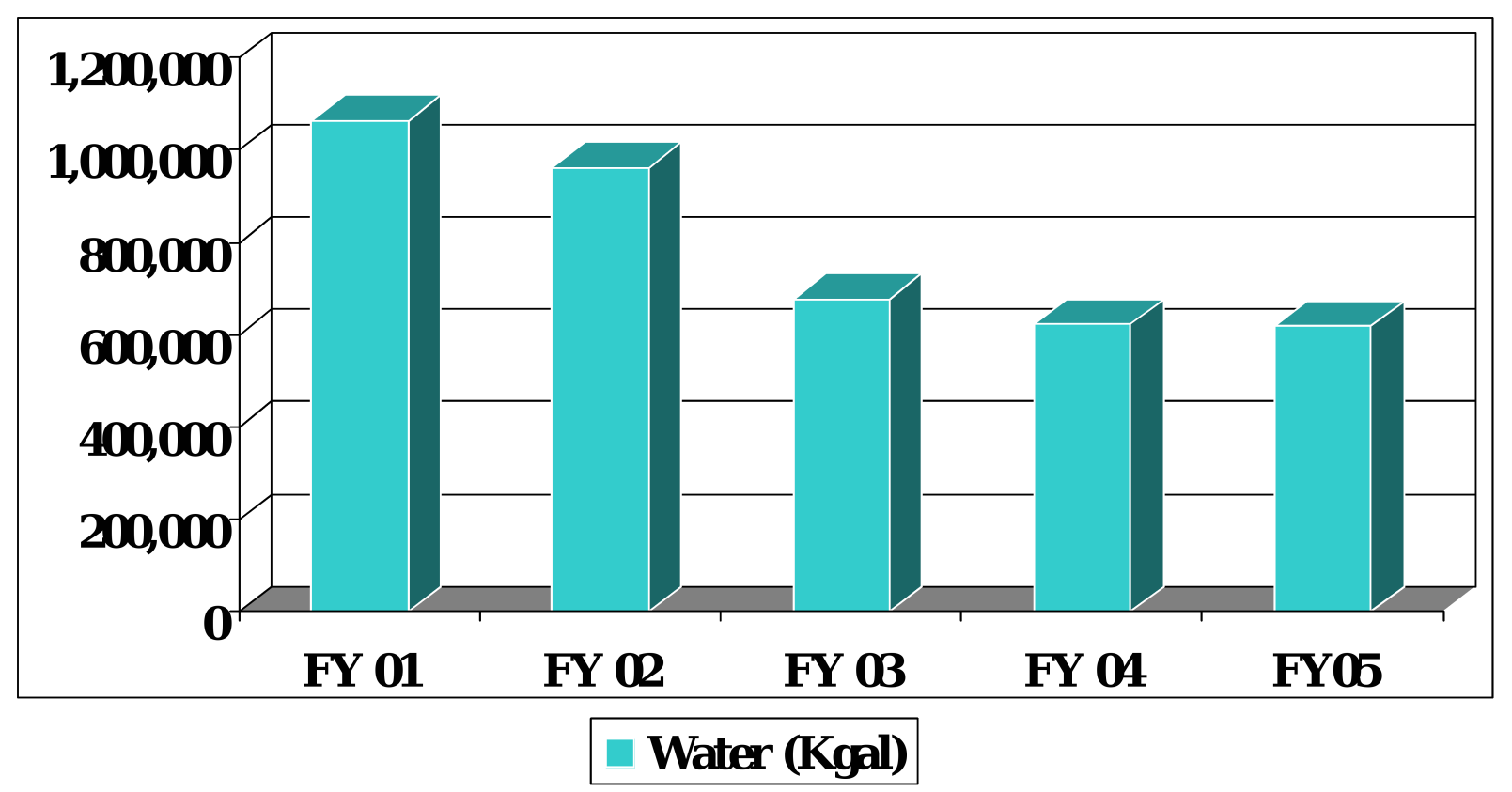
Natural Gas Consumption



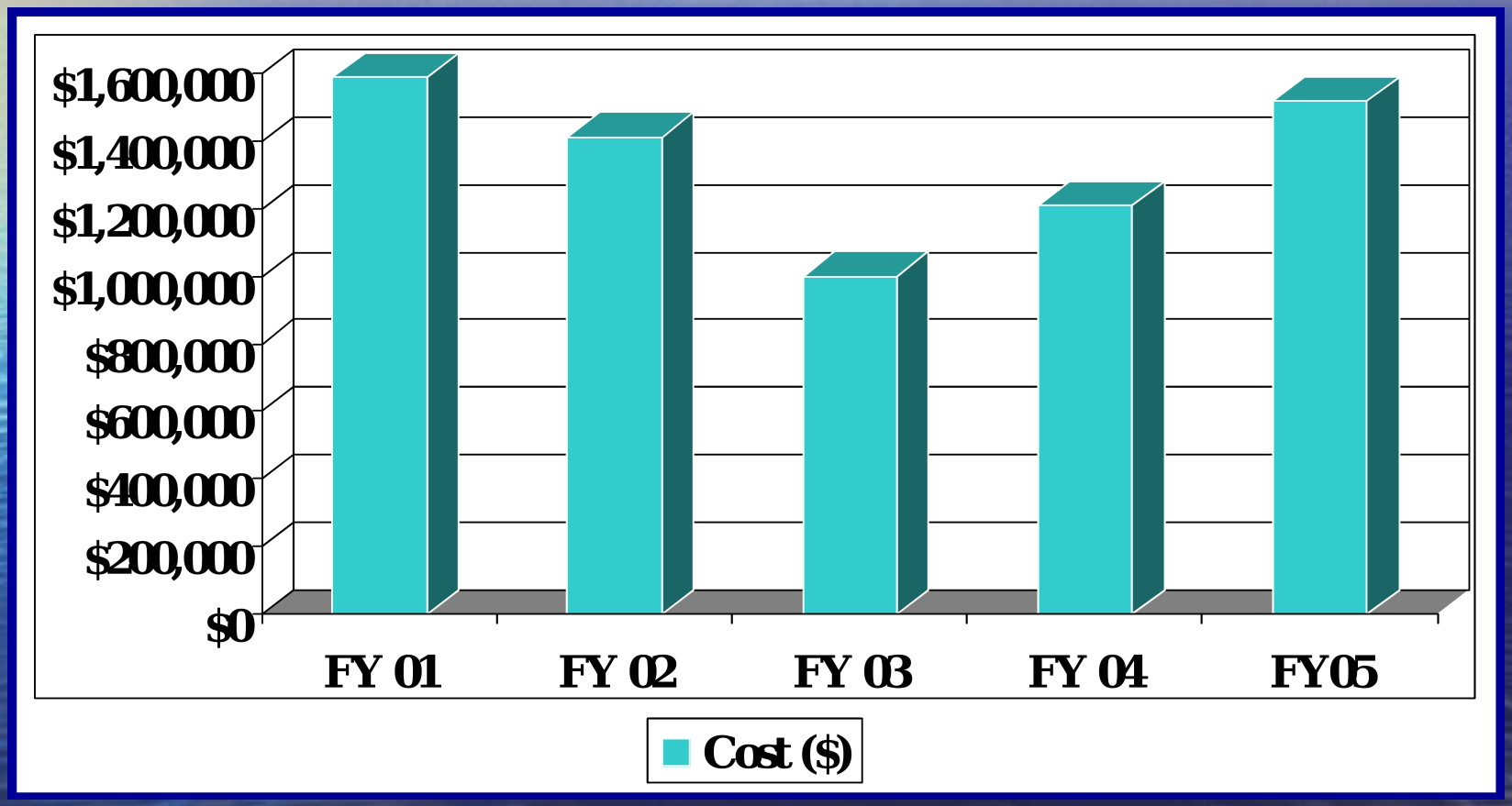
Natural Gas Cost



Water Usage


1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
FY 01
FY 02
FY 03
FY 04
FY05
Water (Kgal)

Water Cost

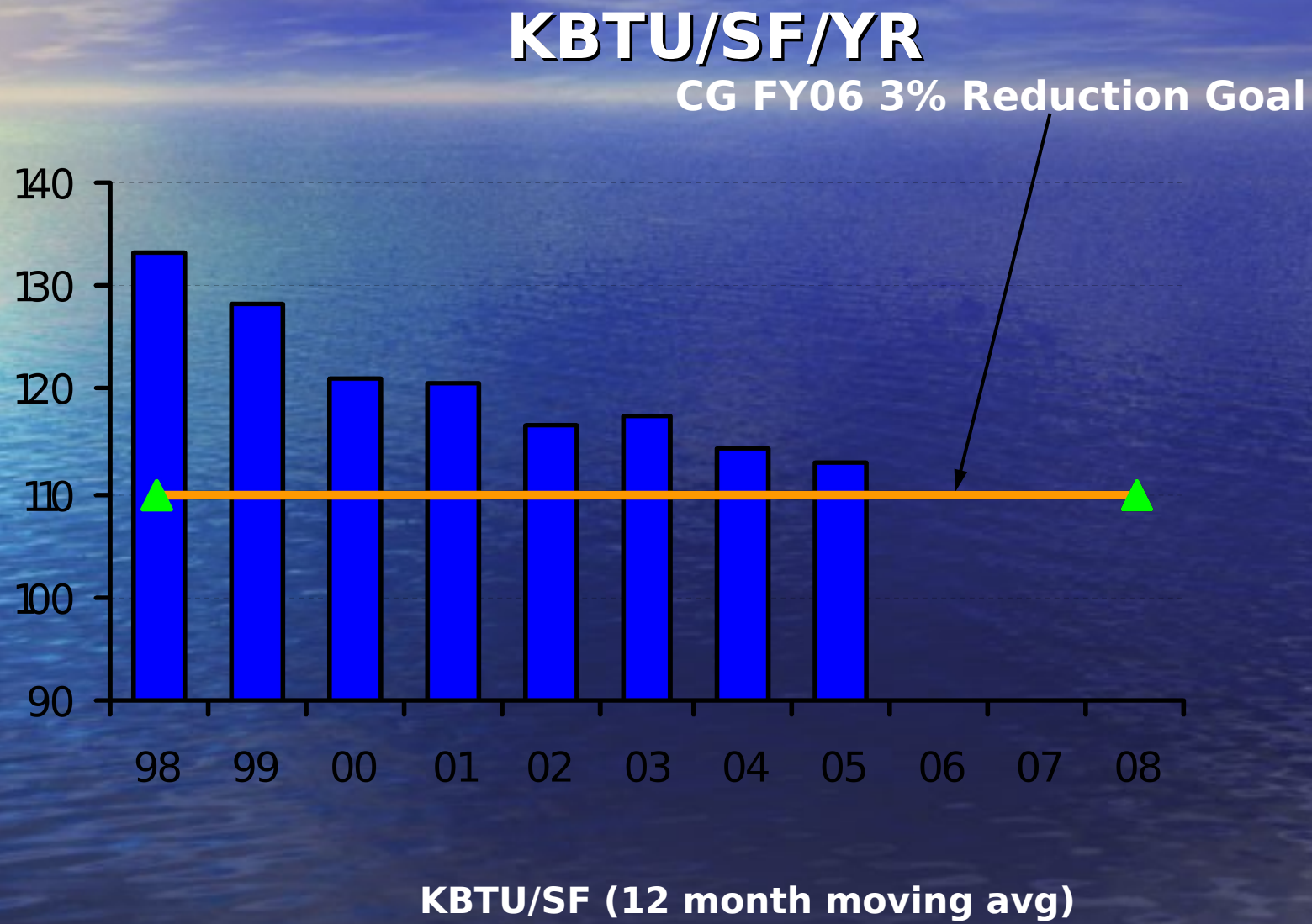

$1,600,000
$1,400,000
$1,200,000
$1,000,000
$800,000
$600,000
$400,000
$200,000
$0
FY 01
FY 02
FY 03
FY 04
FY05
Cost ($)

Projected Cost Variations FY06

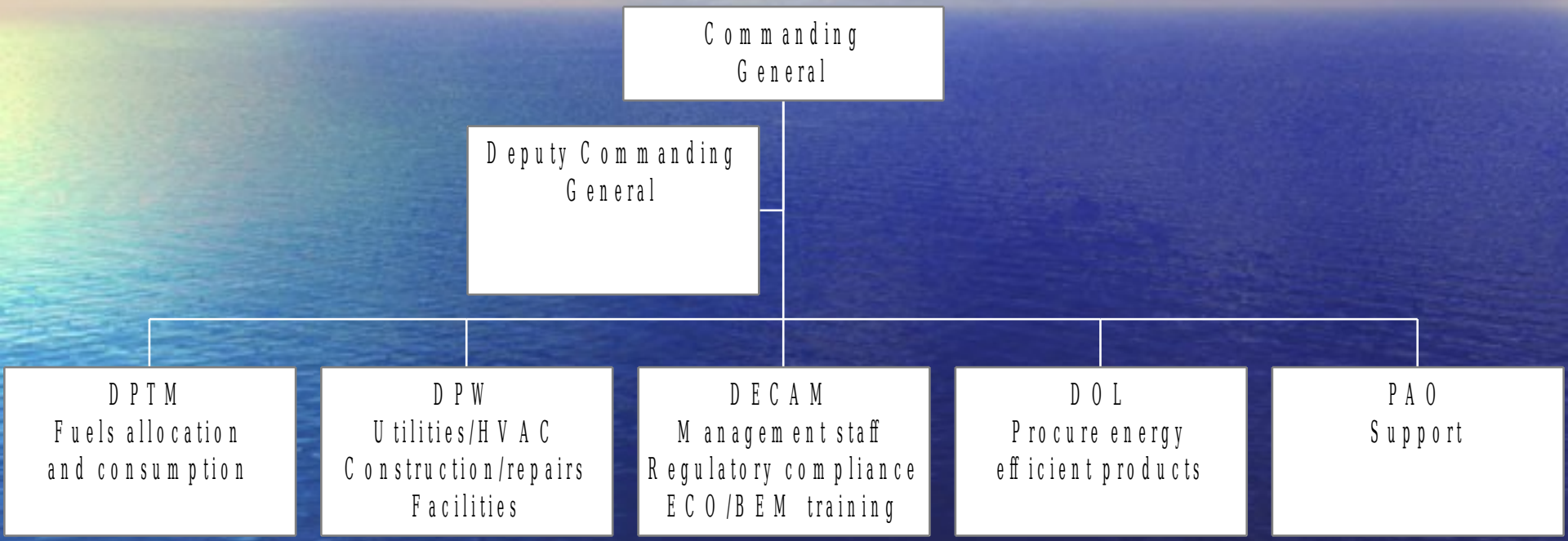
- Electricity = +$ 500,000
- Natural Gas = +$ 3,500,000
- Water = +$ 0

- **FY 06 Total = + $4,000,000!!!**
- **Energy purchases affect Fort Carson operational funding**

Energy Reduction Goals



Who is Responsible?



You have an impact on Fort Carson Energy U

Why is there an ECO/BEM program?

- Over 900 facilities on Fort Carson!
- A significant amount of energy can be wasted in a facility if an energy related problem is unknown or ignored
- Facility managers and building occupants are the most aware of changes in a facility (i.e. temperature drop/increase, lighting problems, complaints, etc.)

Energy Conservation Officer (ECO)

- A commissioned officer (0-1 or above), or equivalent civil service officer appointed within each level of command
- Term of 12 months or more
- Attends ECO/BEM class within 60 days of appointment

ECO Responsibilities

- Ensures there is a Building Energy Monitor (BEM) for every building/area.
- Publishes/maintains a unit/activity Energy SOP
- Inspects all buildings on a monthly basis (FC Form 22)
- Maintains ECO/BEM continuity books
- Plans operations and activities to conserve energy and water

Building Energy Monitor (BEM)

- Appointed by their unit/activity ECO
- One BEM per building (BEMs can be assigned multiple buildings)
- Attends ECO/BEM class within 60 days of appointment

BEM Responsibilities

- Inspects assigned building(s) weekly
- Maintains energy conservation documentation
- Ensures that R&U personnel make any immediate repairs necessary or
- Ensures that work orders are called in for repairs

Energy Conservation Records

- BEMs maintain the following documents:
  - Copy of 7th ID and FC Reg 200-1
  - BEM Handbook
  - Appointment orders for BEM and alternate
  - Copy of ECO/BEM course certificates
  - Energy SOP
  - Weekly inspection checklists (Form 22)
  - Work order log (back of Form 22)

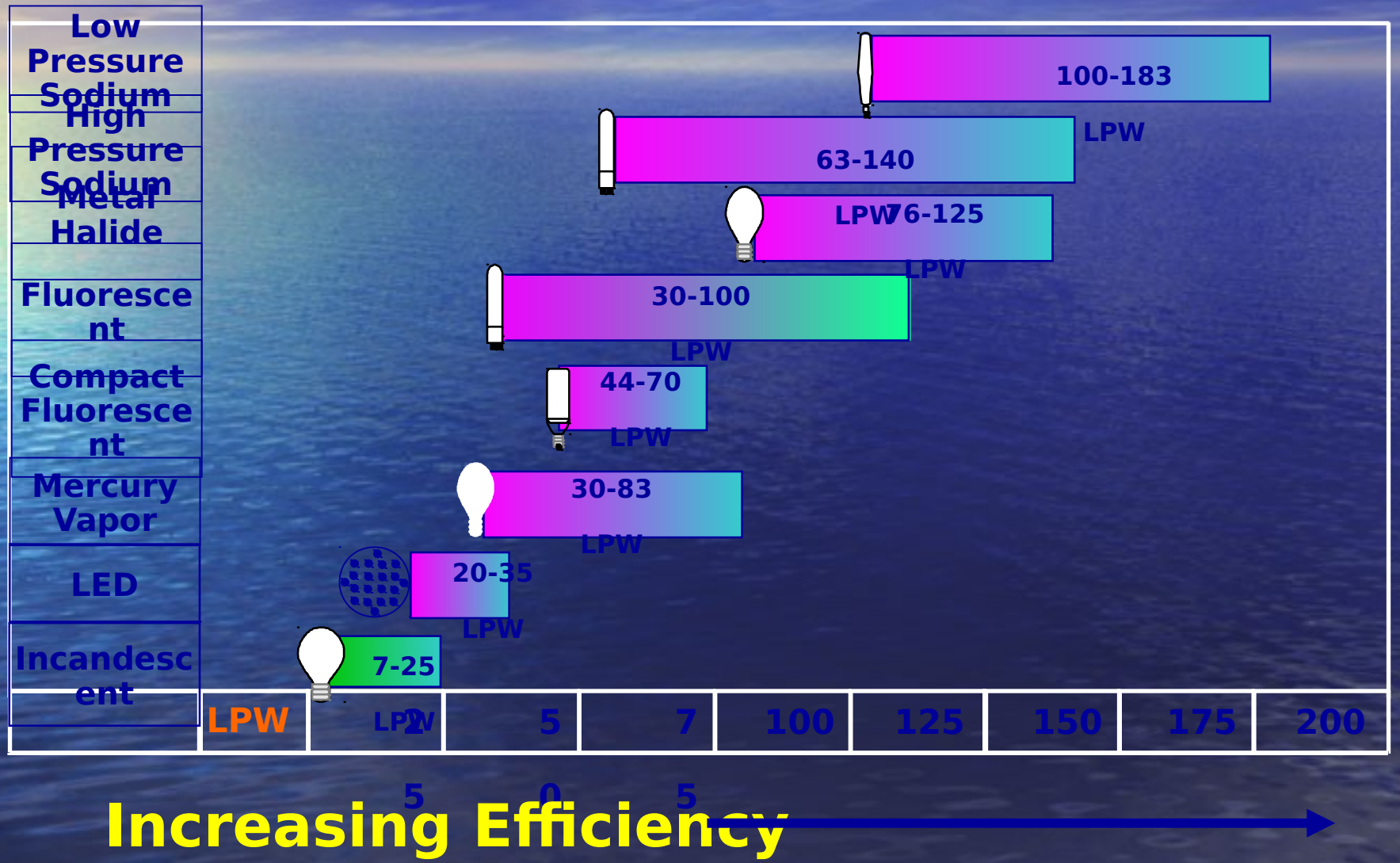
What can you do?

Lights, Computers, Copiers, and Printers

- Turn lights and equipment off when not in use
- Buy energy efficient equipment
- Use compact fluorescents and delamp overlit areas

Recommended High Efficiency Types are CFLs, Fluorescents, MH, & HPS

Lumens Per Watt (LPW)



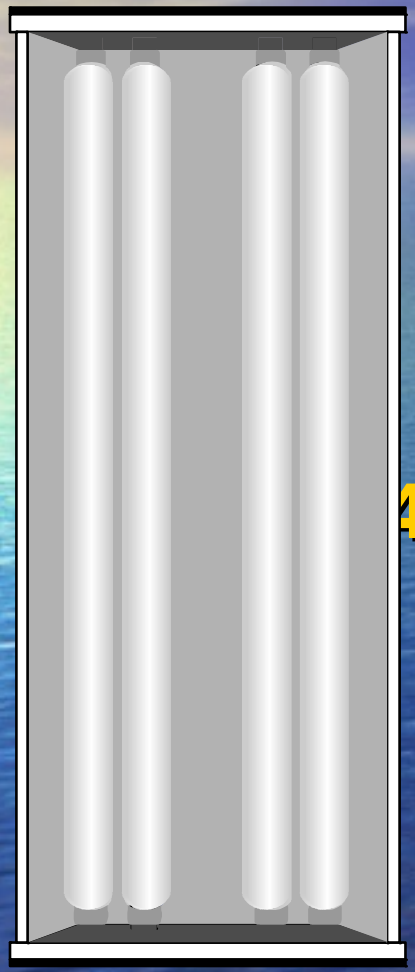
Which costs more – Incandescent or CFL ?

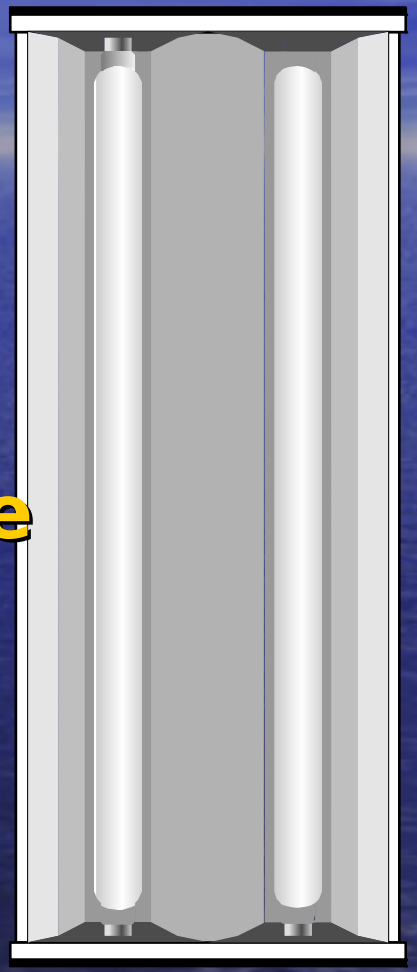
18W Compact Fluorescent

75W Incandescent

			75W INCAND	18W COMP FL
LIGHT OUTPUT (LUMENS)			1200	1200
LAMP FIRST COST			**$0.50**	**$6.00**
LAMP LIFE (HOURS)			750	10000
LAMP REPLACEMENTS			13	1
ENERGY USE OVER 10,000 HRS (kWh) (5 years, 8 hrs/day, 250 days/yr)			750	180
ENERGY COST @	$0.0310	/ kWh	**$23.25**	**$5.58**
DEMAND COST @	$6.25	/ kW/month	**$28.13**	**$6.75**
TOTAL LAMP COSTS FOR 10,000 HRS			**$58.00**	**$18.30**
TOTAL SAVINGS				**$39.70**

Delamping





Remove 2 lamps in a 4-lamp fluorescent fixture

and save nearly half the energy (still have some energy consumed in ballast)

Savings of nearly $10 per fixture/per year

Army Light Level Standards

- Desktop - 50 foot-candles
- Other work areas - 30 foot-candles
- Hallways - 10 foot-candles

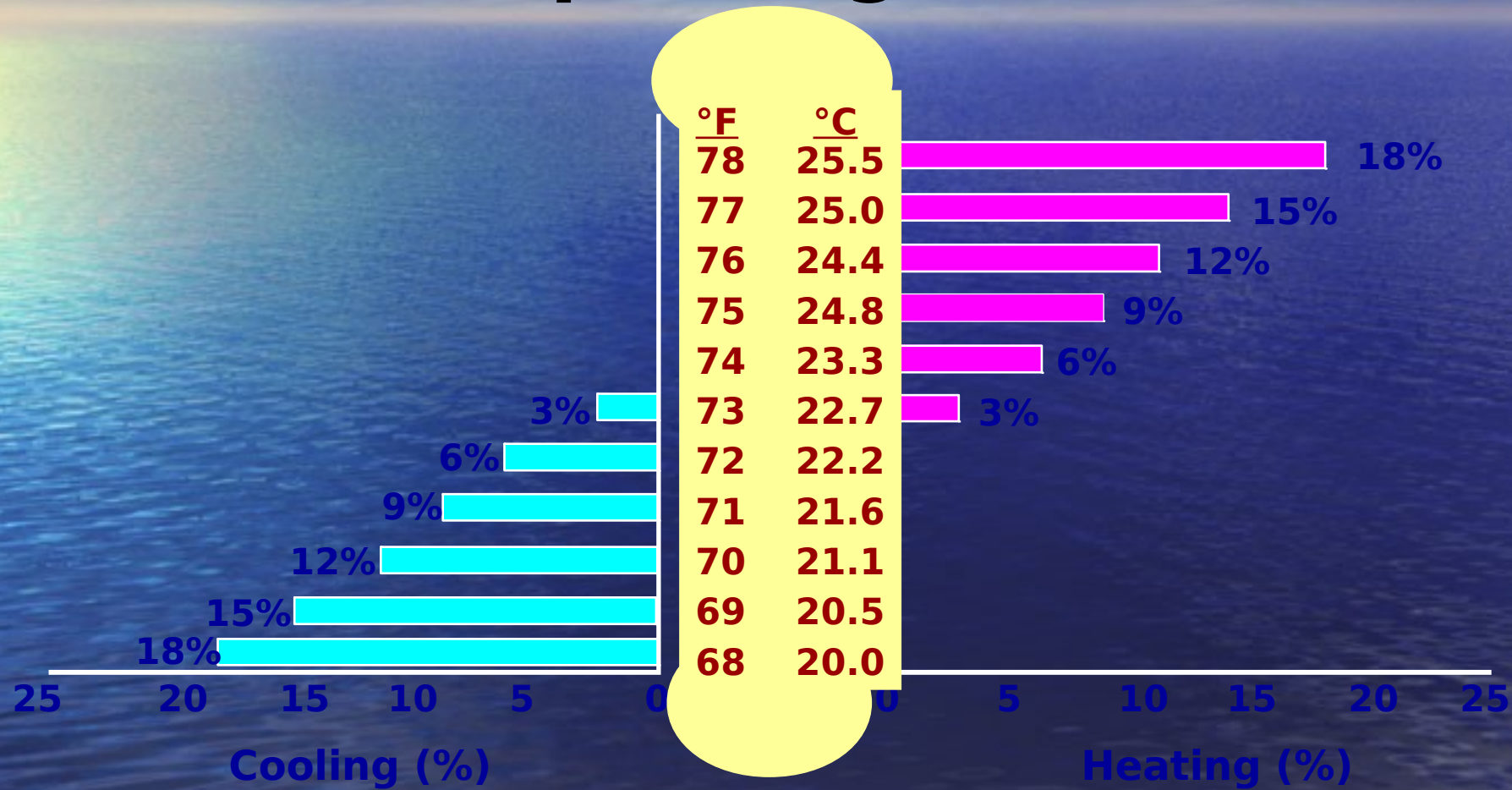
Number of Fluorescent Lamps
Rules of Thumb

- Office areas - 2 or 3 lamp fixtures
- Hallways - 1 lamp fixture
- 4 lamp fixtures are usually wastefu

Use of Heat/Air Conditioning

- Turn off when not needed
- Properly set thermostat(s) and programmable thermostats
- Use the sun to your advantage: Use shades and drapes to block windows when its too hot and open up when its too cold for heat gain

Over-Heating or Over-Cooling Increases Energy Use at least 3% per degree F (6%/°C)



Doors

- Check the condition and fit of doors (especially exterior doors)
- Weather-stripping or door sweeps in place
- Closed when heat or cooling system on

Windows

- Missing or cracked
- Weather-stripping or caulking in place
- Closed when heat or cooling system on

Motor Pools and Shops

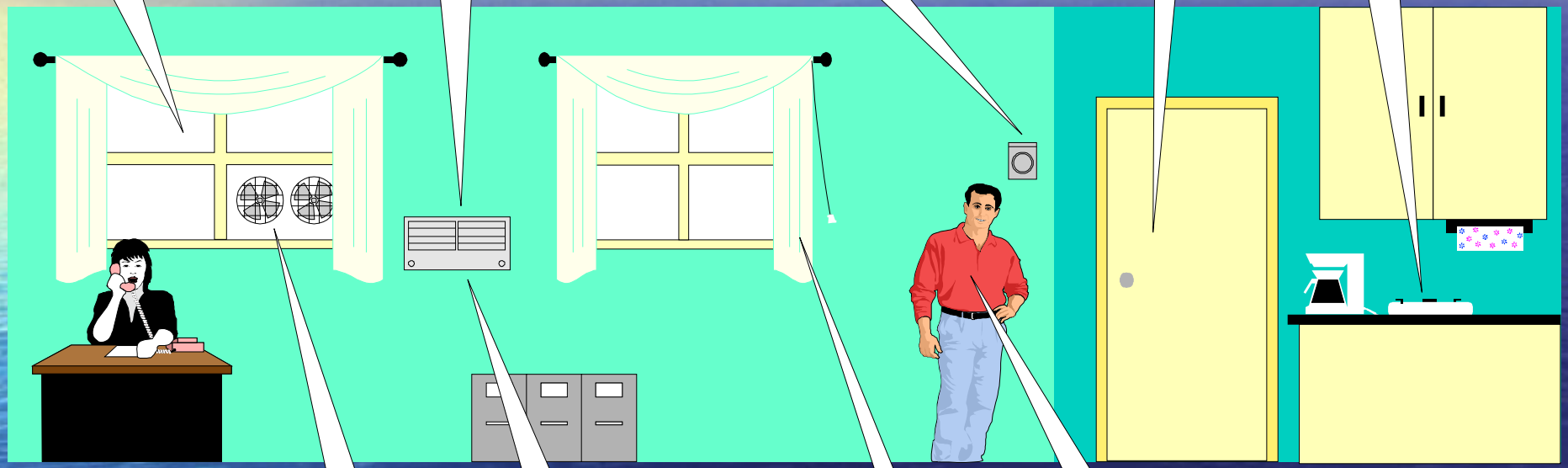
- Close bay doors when heat is on
- Turn off lights when not in use

Reduce Water Usage

Fix Leaking Faucets

Follow water restriction guidelines

Walk Through


Do DOORS and WINDOWS seal properly when closed?
Are WORK AREAS arranged for energy efficiency?
Are THERMOSTATS at the proper settings?
Is UNUSED SPACE closed off from the rest of the building?
Is HOT WATER too hot or being wasted?
Are FANS left running unnecessarily?
Is the AIR CONDITIONER turned off at the end of the day?
Do you USE WINDOW SHADES to make nature work for you?
Do you DRESS appropriately?

What is Fort Carson doing to help save energy?

Energy Conservation Initiatives

- Boiler upgrades, motor replacements, lighting retrofits and preventative maintenance
- Expansion of Utility Control System
- Energy and water efficient clothes washers and air conditioners now specified in contracts
- Investigating and demonstrating renewable energy technologies (solar walls, photovoltaics, fuel cells, etc.)
- Integrating energy efficiency into facility designs

Energy Conservation Projects

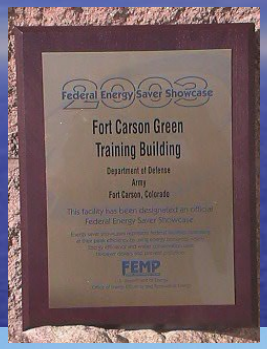
Active energy such as these photovoltaic systems save Fort Carson $

- Solar heated hangar at Butts
- Supplemental heat for facility saving $14,000/year

Energy Conservation Projects

- Fort Carson applying the Sustainable Project Rating Tool (SPiRiT) to new facilities

- Example: New training facility achieved a silver rating (bronze, silver, gold and platinum are the levels)



Bottom-line

- Keep an eye on your facility for energy saving opportunities
  - Buying new equipment (computers, air conditioners, etc.)
- Implement self-help energy conservation measures where possible…
  - Good energy conservation practices add up across the facility!
- Identify the big projects to DPW…Call in Work Orders to the DPW Work Order Desk

Support Numbers

- Call in Work Orders to DPW at 526-5345
- Questions or concerns please contact the Fort Carson energy manager
  - Scott Clark, 526-1739